GA1.13:IMTEC-90-51

United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Oversight, Committee on Ways and Means, House of Representatives

COMPLETED 19

July 1990

TAX SYSTEM MODERNIZATION

Management Mistakes Caused Delays in Automated Underreporter System

GAO/IMTEC-90-51

GAO

United States
General Accounting Office
Washington, D.C. 20548

Information Management and
Technology Division

B-227683

July 10, 1990

The Honorable J. J. Pickle
Chairman, Subcommittee on Oversight
Committee on Ways and Means
House of Representatives

Dear Mr. Chairman:

In response to your request of December 11, 1989, we reviewed the Internal Revenue Service's (IRS) Automated Underreporter System. This system is intended to help process underreported income cases by, among other things, giving IRS service centers the ability to readily locate individual case files. According to IRS, this system is its "point system" for modernization of the tax system; that is, it will serve as an example of how to conduct system development during the modernization. Our objectives were to determine the reasons for any changes in the system's implementation schedule and how the system will be integrated with the IRS Tax System Modernization effort. You also asked us to analyze the system's costs and to identify any changes in the system's functionality or design since IRS approved it.

In 1987, IRS estimated that about $13.7 million would be spent to design the system, develop the software, and initiate the system pilot.[1] IRS' Chief Information Officer told us that IRS now expects to spend about $21 million. (See appendix I for our analysis.) Total life cycle costs were estimated to be $71 million in 1987 and $122 million in a current estimate. This increase is primarily due to IRS' failure to include operation costs in its 1987 estimate. Since IRS approved the Automated Underreporter System in 1987, its functionality has not changed.

Results in Brief

IRS officials' haste to complete the Automated Underreporter System has led them to use incomplete system designs and shortcut important systems development steps. These problems, compounded by a lack of adequate technical expertise and experience, have delayed the scheduled start of the system pilot from 1988 to October 1990. As of April 1990, software coding had not begun, and plans to deploy the system to all service centers were uncertain. As pointed out in our previous work, the

[1] As used in this report, the term "system pilot" or "pilot" refers to an operational version of the system in one IRS service center.

problems experienced by IRS in developing the Automated Underreporter System may be systemic and could adversely affect other modernization projects. In this respect, IRS has recently instituted a set of management processes to control its systems development efforts; these processes have the potential to mitigate the risks associated with these efforts.

To compensate for delays, IRS is developing an interim system to perform one of the important functions of the Automated Underreporter System—tracking the locations of underreporter cases. The interim system is based on the same design specifications and the same hardware as the Automated Underreporter System. Although the interim system is also experiencing some delays, IRS plans to deploy it to all service centers by the end of 1990. It will remain in operation until the completed Automated Underreporter System replaces it. Although IRS wants to minimize software development costs, it has not determined what costs could be saved by eliminating redundant software development for the two systems.

IRS intends to integrate the Automated Underreporter System with the overall Tax System Modernization effort; however, software modifications will be needed for 7 of the system's 10 major functions in order to accomplish this fit. In addition, the master plan describing how the integration will occur will not be available until September 1990.

This report recommends ways to improve the cost effectiveness of the Automated Underreporter System by considering a software development alternative, establishing realistic milestones, and addressing staffing needs. We are also recommending that IRS take action to improve the prospects for successfully developing other modernization projects by assigning experienced technical, procurement, and management staff to systems development projects at the outset.

Background

The underreporter program identifies and resolves discrepancies between taxpayer returns and corresponding information returns submitted by employers, banks, corporations, and other payers. Each year, payers submit over 1 billion information returns reporting wages, interest, dividends, nearly every category of income, and certain deductions.

IRS' Martinsburg Computing Center matches this information with individual income tax returns to identify potential underreporting of

income. About 10 million mismatches are identified annually for further examination. Data on these mismatches are shipped on magnetic tapes to IRS' 10 service centers where the data are printed. A request to a Federal Records Center for the taxpayer's tax returns is also issued.

At present, service centers use labor-intensive, paper-driven methods to process the work load. Clerks must sort tax returns by social security number, associate them with data on mismatches, and place them in case folders. Tax examiners then review the cases to determine if income actually was underreported. If so, tax examiners compute and record the amount of underreported income and other pertinent information. Data entry clerks input these data into systems, which generate notices to taxpayers. When taxpayer responses arrive, clerks file them in case folders and tax examiners review the cases and record results for subsequent data entry by clerks.

The current underreporter process has numerous problems. Clerks must sort and match many paper documents. Service centers cannot readily locate individual cases as they move through the process. Manual computation and massive data input inevitably introduce errors that degrade the quality of taxpayer notices.

In May 1987, IRS began the Automated Underreporter System as a standalone independent system to automate this process. The system is expected to allow tax examiners, in reviewing tax returns, to access all computerized case-file information associated with these returns. This process will eliminate the need to sort tax returns. The system will give current information about the case files' physical location and processing status to enable the IRS to respond faster to taxpayer inquiries. In addition, tax examiners will enter results directly into the automated system, eliminating the need for data entry clerks. IRS expects the system to save about 1,200 staff years annually when fully implemented.

IRS has designated the Automated Underreporter System as part of its modernization effort. Through modernization, IRS plans to fully automate its tax processing with systems that work together to improve service to the taxpayer, increase productivity, and reduce operating costs. This modernization effort is composed of a number of independent projects, which IRS intends to fit into an integrated system that will meet the agency's needs into the next century. However, particulars about integration are not expected until the modernization master plan is completed in September 1990.

Because development of the Automated Underreporter System has been delayed and an immediate need for automation exists, IRS management decided to develop an interim system to track each underreporter case and to deliver this capability to all 10 service centers by July 1990. The Austin Compliance Center had developed and was using such a system to control underreporter cases. Austin's system could perform several of the functions planned for the Automated Underreporter System. IRS decided to modify the Austin system to include functions and use hardware from the planned Automated Underreporter System. On the basis of savings at the Austin Compliance Center, IRS expects that the interim system will save 141 staff years annually, valued at $2.3 million. Based on our analysis of IRS' fiscal year 1990 budget documents, we estimate that software development costs for the interim system will be about $400,000. Because the hardware purchased to run the interim system will also be used for the Automated Underreporter System, these hardware costs are not included in the interim system's cost.

Management Mistakes Caused Automated Underreporter System Schedule Slippages

IRS management mistakes caused the pilot for the Automated Underreporter System to be delayed more than 2 years. The system pilot—planned to start in fiscal year 1988—has been deferred to October 1990 because of inadequate system design products and limited technical and project management expertise.

First Schedule Slippage

The development schedule for piloting the system slipped about a year to June 1989 because IRS originally assigned project management responsibility to a group with limited system development expertise. The Ogden Service Center was given initial responsibility for system development since it had proposed the project. According to a 1987 plan, Ogden was to develop the system and start the pilot in fiscal year 1988. However, by the end of 1987, IRS decided that the Ogden Service Center was not prepared to lead the project. IRS officials at the national office and the Ogden Service Center told us that the Ogden staff lacked sufficient technical and management experience in developing systems of this magnitude.

To address this problem, IRS transferred control of the development effort to the national office to enhance project management, ensure IRS-wide user involvement, and improve technical and procurement support. IRS appointed a new project manager in February 1988, hired a contractor to assist in systems analysis and design, and rescheduled the

pilot to begin in June 1989. However, the new project manager told us that he had no previous experience with large systems development or procurement, and that he lacked adequate technical and procurement staff during 1988. He acknowledged that these factors contributed to project delays. The project manager also told us that IRS management recognized his need for additional staff in November 1988 and that staff became available starting in December 1988.

Second Schedule Slippage

The pilot schedule slipped another year from June 1989 to June 1990, when, in its haste to finish software specifications and issue a solicitation for software development, project management exercised poor technical judgment concerning a contractor's work. Specifically, project management (1) waived compliance with IRS' software documentation standards for analysis and design, and (2) issued a follow-on solicitation for software development that was based on analysis and design products that did not meet standards, were not integrated, and were incomplete. The project manager told us that he waived compliance with IRS' software documentation standards because he believed that this would accelerate development of the system. Consequently, the contractor did not prepare supporting documents that met IRS software documentation standards. This included documents needed to define system parameters such as data flow diagrams, structure charts, and run descriptions.[2]

Two major segments of the system—document control and tax analysis—were designed under separate contracts by the same contractor. However, project management did not require the integration of the two segments, which must work together. In addition, designs for two other subsystems (archiving data and management reporting) were not available until April 1989, 2 months after the follow-on solicitation for software development had been issued.

Even though the design and analysis products were incomplete as a basis for issuing a solicitation for software development, the project manager said he proceeded with the software development solicitation to expedite the procurement process. He believed that the analysis and design products would be ready by the time software development actually began. An official at the General Services Administration's Office of Technical Analysis, IRS' contracting agent, confirmed that the analysis and design documents were incomplete.

[2]IRS standards require that systems be described using these documentation techniques.

Several vendors interested in the software development solicitation reviewed the system design information provided; however, only one vendor submitted a proposal. According to a vendor who did not submit a proposal, the design documents were unclear about what IRS required. The only proposal received was more than five-times higher than the General Services Administration had anticipated. By May 1989, project management recognized that proceeding with the software development was not cost effective and sought approval to cancel the solicitation and assign internal staff to revise the design specifications to incorporate standards and integration requirements. IRS approved these actions and also slipped the system pilot schedule to June 1990.

Third Schedule Slippage

The pilot schedule slipped again from June 1990 to October 1990 because it took longer than anticipated to incorporate user comments into the software design specifications and to award the software development contract. As of April 1990, IRS expected to start software development for a portion of the system in May, 1990. IRS had planned to have the software specifications completed by November 1989 and to begin software development for the entire system in December 1989. As of April 1990, IRS management had not established a schedule to complete the system, and software development had not begun.

IRS' Actions to Improve Systems Development

IRS' Chief Information Officer acknowledged that mistakes were made in managing this system development effort, but believes that the Automated Underreporter System has been an important training ground for IRS automation efforts. He said that the original milestones were intentionally set optimistically to educate the users on the difficulties in developing major systems, and that IRS has learned from this experience. To add more control and predictability to system development, IRS has recently instituted a number of processes that it believes will avoid similar system development problems in the future. The processes include active involvement of user groups in systems development activities, top management involvement in making key decisions, and independent technical evaluations of results at major milestones. The Chief Information Officer believes that the processes now in place will limit the risk of future system development efforts.

While we agree that these processes should help IRS to manage the risk, mistakes and schedule slippages cannot be wholly resolved with improved processes. Successful development of major systems depends heavily upon experienced and capable technical and project leadership

with the authority to attain the desired outcomes. For example, IRS has had many of these processes in place for at least a year, during which time several of the mistakes and delays discussed in this report occurred.

Interim System Shows More Progress Than Automated Underreporter System

IRS decided to develop and deliver a separate interim system as a near-term solution for the 10 service centers because the Automated Underreporter System had been continuously delayed. The interim system is intended to control and track underreporter case-files, and is based on the Automated Underreporter System design specifications and its system architecture, such as hardware and system software.

IRS originally intended to deliver the entire interim system to all service centers by July 1990. However, software development for the interim system has fallen behind schedule because IRS is still incorporating user comments into the design specifications. IRS now expects to deliver a portion of the system by July 1990 to all service centers and the full interim system by the end of 1990. However, uncertainty about hardware availability casts doubt on this July date.

As of April 1990, the contract for the hardware had not been awarded, therefore hardware delivery will likely be delayed. After the hardware is delivered, sufficient time is still required to install and completely test it before the interim system can become operational. Thus the initial delivery of the interim system probably will be delayed beyond July 1990.

Despite delays, the interim system shows progress. IRS is currently writing software for the system and plans to deliver the completed interim system to all service centers by the end of 1990. On the other hand, as of April 1990, milestones for delivering the completed Automated Underreporter System were still not established, and software development had not begun.

Interim System Is a Possible Starting Point for the Automated Underreporter System

Both the interim system and the Automated Underreporter System are managed by the same project management team and share some of the same technical and testing resources. In addition, both systems are using the same design specifications, the same software language, and the same hardware. However, IRS has not evaluated the savings that could be derived from using the completed interim system as the starting point for the expanded automation effort. IRS currently plans to scrap the

interim system and replace it with the Automated Underreporter System.

The Automated Underreporter System Will Require Modification

IRS presents the Automated Underreporter System as a Tax System Modernization project, but to date it has been developed as a stand-alone, independent system. Available information indicates that most of the functions will require modifications before fitting with other modernization projects. In addition, IRS' master plan, which should clarify how the systems in the modernization effort will interface with each other, is not planned for completion until September 1990.

Modernization planning is still in its early stages and many of its specific requirements have not yet been completed. Consequently, any systems developed today will need changes to accommodate modernization requirements that will emerge later. Of the 10 major functions performed by the Automated Underreporter System, current IRS estimates indicate that 7 must be revised to fit with the plan for the modernized environment. For example, IRS told us that the master plan will call for imaging, a technology for electronically storing a picture of documents such as tax returns and taxpayer correspondence, which IRS expects to implement sometime after 1995. The underreporter system will require software revisions to accept document images. IRS' Chief Information Officer pointed out that IRS would make every effort to minimize so-called throwaway software for the system, and that this issue required consideration by top management.

Systems Development Problems Cited Previously by GAO

Mismanagement of system development efforts at IRS has been cited in other recent reports. We found instances where projects failed or were seriously delayed as a result of poor management decisions. Management imposed unrealistic schedules and accepted vendor products that were incomplete.

Our May 1989 report on IRS' Electronic Filing System noted that IRS, in pursuing an overly optimistic schedule for developing an interim system, had accepted and implemented contractor-developed software without adequately testing it.[3] When the software failed to perform as intended, IRS had to replace it at an estimated cost of $2 million. Contributing to the problems with the defective software was IRS officials'

[3]ADP Modernization: IRS Needs to Assess Design Alternatives for Its Electronic Filing System (GAO/IMTEC-89-33, May 5, 1989).

failure to clearly define system performance requirements and allow enough time to decide whether the deliverables were acceptable.

Also, our June 1989 report on IRS' Automated Examination System pointed out that IRS accepted an inadequate description of user requirements from a vendor.[4] The product delivered did not contain the level of detail needed for programming the software, and consequently, the requirements had to be rewritten.

Our February 1990 report on IRS' Tax System Modernization effort also noted that ineffective management caused problems in planning the modernization program.[5] According to the report, IRS pursued three approaches to modernization from 1982 through 1986, yet none of these progressed beyond the planning stage. These failures resulted in part from repeated changes in leadership at IRS and Treasury, a lack of clear management responsibility for the program, and the need for enhanced technical and managerial expertise within the agency's executive ranks.

The Chief Information Officer pointed out that the Automated Underreporter System differs from the projects discussed in these reports in that, as noted earlier, IRS has now instituted a number of system development processes that are intended to mitigate the risks associated with system development. However, this official agrees that, like those projects discussed in our reports, the Automated Underreporter System suffers from limited technical and project management skills.

Conclusions

If incomplete design specifications, unrealistic project schedules, and limited technical and project management expertise for the Automated Underreporter System prevail in the future, these conditions will present high risks which could perpetuate the cycle of project delays and unmet milestones. The Automated Underreporter System and the interim system are concurrent software development efforts that could stretch and dilute available management and staff resources. Of the two, the interim system shows more development progress because the software is being written and could offer a solution in 1990 for addressing some automation needs at the service centers. As of April 1990, software development for the Automated Underreporter System

[4]ADP Modernization: IRS' Automated Examination System—Troubled Past, Uncertain Future (GAO/IMTEC-89-54, June 22, 1989).

[5]Tax System Modernization: IRS' Challenge for the 21st Century (GAO/IMTEC-90-13, Feb. 8, 1990).

had not begun, and the schedule for delivering this system to the service centers had not been established.

We support IRS' decision to proceed with the interim system's software development and deployment as a way of providing near-term help for managing the underreporter case work load. As the service centers use the system, they should benefit from the automated support, and IRS should benefit from users' opinions on ways to refine and improve the requirements for the Automated Underreporter System. Although software for the interim system uses the same hardware and the same design specifications as the Automated Underreporter System, IRS has not explored the option of using the interim system as a starting point for developing the remaining software for the larger automation effort.

We fear that the problems identified in the Automated Underreporter and other major systems are systemic and could adversely affect IRS' ability to successfully design, develop, test, and implement other modernization projects. IRS has recognized the need to better control its systems development efforts by establishing a set of management processes that, if properly implemented, have the potential to mitigate the risks.

Recommendations to the IRS Commissioner

To address the problems experienced by IRS in developing the Automated Underreporter System, the Commissioner, Internal Revenue Service, should immediately direct the Chief Information Officer to

- assess the option to save development costs by using the interim system as the starting point for completing the Automated Underreporter System;
- establish realistic milestones on which both the users and the Congress can rely; and
- verify that staffing needs have been properly addressed.

In light of IRS' broader need for enhanced technical expertise and experience for its overall modernization effort, we also recommend that IRS assign experienced technical, procurement, and managerial staff to key positions for system development projects at the outset. Such staff should have demonstrated capabilities in all phases of the system development life cycle and have demonstrated successful delivery of systems.

We conducted our audit work between August 1989 and April 1990 in accordance with generally accepted government auditing standards.

(See appendix II for our objectives, scope, and methodology.) We discussed our review results with IRS officials and incorporated their comments, as appropriate.

This report was prepared under the direction of Howard G. Rhile, Director, General Government Information Systems, who can be reached at (202) 275-3455. Other major contributors are listed in appendix III.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this letter. At that time, we will send copies to interested parties, including the Commissioner of Internal Revenue, and will make copies available to others upon request.

Sincerely yours,

Ralph V. Carlone

Ralph V. Carlone
Assistant Comptroller General

Contents

Letter		1
Appendix I Analysis of Costs for the Automated Underreporter System		14
Appendix II Objectives, Scope, and Methodology		16
Appendix III Major Contributors to This Report		17
Figures	Figure I.1: Automated Underreporter Expense Categories	14

Abbreviations

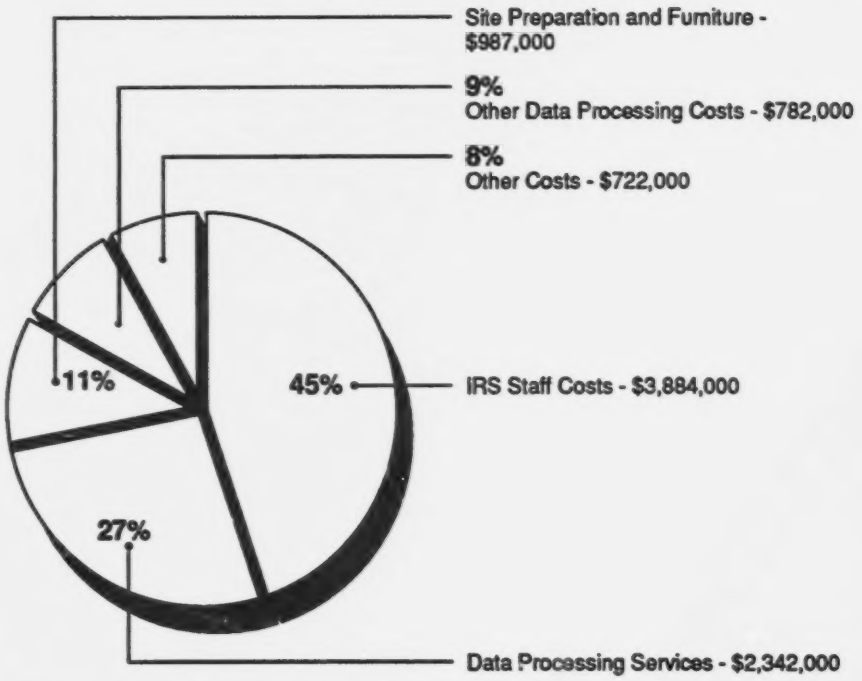
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
IRS	Internal Revenue Service

BLANK PAGE

Analysis of Costs for the Automated Underreporter System

In 1987, IRS estimated that about $13.7 million would be spent to design, develop, and initiate the pilot of the system by fiscal year 1988. According to the Chief Information Officer, the estimated cost for initiating the pilot is now $21 million. As of fiscal year 1989, IRS has obligated about $8.7 million for the development of the underreporter system. The major categories of those obligations are shown in figure I.1.

Figure I.1: Automated Underreporter Expense Categories



This chart represents Automated Underreporter's cumulative obligations totalling $8,715,000 for fiscal years 1987 through 1989.

The category "Data Processing Services" represents contracts with government agencies or private firms for programming services, data base services, and related clerical operations.

The $8.7 million obligated for this project represents about 41 percent of the latest development cost estimate. The design for the Automated

Underreporter System is not yet complete. With the remaining $12 million, as of April 1990 IRS still has to complete the software design specifications, write the software, acquire the hardware, conduct acceptance testing, and initiate the system pilot.

The system is now projected to cost $122 million over its life, up from $71 million projected in 1987, primarily because operating costs were not included in the 1987 estimate.

Objectives, Scope, and Methodology

Our review objectives were to (1) identify and determine the reasons for changes in the Automated Underreporter System's completion schedule, (2) analyze the system's costs, (3) determine how the system will be integrated with other systems included in IRS' tax system modernization plan, and (4) identify changes in the system functionality or design since IRS approved it. To accomplish these objectives, we reviewed IRS system development policies and regulations, as well as various documents related to the underreporter system, such as planning and budgeting documents, status reports, contracts, and contractor products. We also interviewed IRS officials responsible for designing, developing, and testing automated systems; the project managers and staff for the underreporter system and the interim control system; and IRS and General Services Administration contracting officials. We conducted our audit work primarily at IRS headquarters in Washington, D.C.; the Ogden Service Center in Ogden, Utah; and the Austin Compliance Center in Austin, Texas.

We conducted our audit work between July 1989 and April 1990 in accordance with generally accepted government auditing standards. We discussed our review results with IRS officials and incorporated their comments as appropriate.

Major Contributors to This Report

Information Management and Technology Division, Washington, D.C.	Hazel Edwards, Assistant Director John McIlwaine, Senior Evaluator Rajiv Gujral, Technical Adviser
Denver Regional Office	Ted Baird, Evaluator-in-Charge Robert Stewart, Staff Evaluator Pamela Tumler, Reports Analyst

Requests for copies of GAO reports should be sent to:

U.S. General Accounting Office
Post Office Box 6015
Gaithersburg, Maryland 20877

Telephone 202-275-6241

The first five copies of each report are free. Additional copies are $2.00 each.

There is a 25% discount on orders for 100 or more copies mailed to a single address.

Orders must be prepaid by cash or by check or money order made out to the Superintendent of Documents.